

Test Report

Verified code: 556823

Report No.: E202304209404-1

Customer: Lumi United Technology Co., Ltd

Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

Sample Name: Presence Sensor FP2

Sample Model: PS-S02E

Receive Sample Date: Apr.25,2023

Test Date: Apr.25,2023 ~ Apr.27,2023

Reference Document: Radiocommunications (Electromagnetic Radiation — Human Exposure) Standard 2014 AS/NZS 2772.2:2016/Amdt 1:2018

Test Result: Pass

Prepared by: Chen Xiaocong Reviewed by: Jiang Tan Approved by: Zhao Zetian

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2023-04-28

GRG METROLOGY & TEST GROUP CO., LTD.

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E202304209404-1	Original Issue	2023-04-28

- 1). The maximum output power of radar were refer to the report CR230422500-14 which issued on 04-27-2023 by China Certification ICT Co.,Ltd(Dongguan).
- 2). The maximum output power of BLE were refer to the report E20221124437601-2 which issued on 01-11-2023 by GUANGZHOU GRG METROLOGY & TEST CO., LTD.
- 3). The maximum output power of 2.4G WIFI were refer to the report E20221124437601-1 which issued on 01-10-2023 by GUANGZHOU GRG METROLOGY & TEST CO., LTD.

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1 GENERAL DESCRIPTION OF EUT

1.1 APPLICANT INFORMATION

Name: Lumi United Technology Co., Ltd
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

1.2 MANUFACTURER

Name: Lumi United Technology Co., Ltd
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

1.3 BASIC DESCRIPTION OF EUT

Product Name: Presence Sensor FP2
Product Model: PS-S02E
Adding Model: PS-S02D
Trade Name: Aqara

Models Difference: That EUT (Presence Sensor FP2) Model Numbers PS-S02E and PS-S02D have the same technical construction including circuit diagram,PCB layout,hardware version and software version identical,except sales area,packaging and accessories are different.

Trade Name: Aqara
Power Supply: DC 5V/1A
Frequency Band: 2402MHz-2480MHz for Bluetooth LE with 1M
2412MHz-2472MHz for 2.4G WIFI 802.11b/g/n HT20
2422MHz-2462MHz for 2.4G WIFI 802.11n HT40
60-63.35GHz&60.60-63.78GHz for Radar

Antenna Specification: BLE&2.4GHz WIFI: FPC antenna with 1dBi gain (Max)
Radar: Internal Integrated antenna with 5dBi gain (Max)
Temperature Range: -10°C~40°C
Hardware Version: X2
Software Version: 1.0.0_0004.0004

Sample submitting way: Provided by customer Sampling
Sample No: E20221124437601-0003,E20221124437601-0007,E20221124437601-0009
Note: /

2 LABORATORY AND ACCREDITATIONS

2.1 LABORATORY

The tests & measurements refer to this report were performed by GRG METROLOGY & TEST GROUP CO., LTD.

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People's Republic of China.

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3 TECHNICAL REQUIREMENTS SPECIFICATION IN

3.1 RF EXPOSURE EVALUATION

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) an agency of the (Australian) Commonwealth Department of Health has established a Radiation Protection Standard specifying limits for continuous exposure of the general public to RF fields shown in the following table.

**REFERENCE LEVELS FOR TIME AVERAGED EXPOSURE
TO RMS ELECTRIC AND MAGNETIC FIELDS (UNPERTURBED)**

Exposure	Frequency range	E-field strength V/m rms	H-field strength A/m rms	Power flux density W/m ²
Occupational (RF worker)	100 kHz–1 MHz	614	1.63/f	N/A
	1 MHz–10 MHz	614/f	1.63/f	1000/f ²
	10 MHz–400 MHz	61.4	0.163	10
	400 MHz–2 GHz	$3.07 \times f^{0.5}$	$0.00814 \times f^{0.5}$	$f/40$
	2 GHz–300 GHz	137	0.364	50
Non-occupational (general public)	100 kHz–150 kHz	86.8	4.86	N/A
	150 kHz–1 MHz	86.8	0.729/f	N/A
	1 MHz–10 MHz	$86.8/f^{0.5}$	0.729/f	N/A
	10 MHz–400 MHz	27.4	0.0729	2.0
	400 MHz–2 GHz	$1.37 \times f^{0.5}$	$0.00364 \times f^{0.5}$	$f/200$
	2 GHz–300 GHz	61.4	0.163	10.0

NOTES:

- 1 f is frequency, in MHz.
- 2 There are also applicable limits for exposure to instantaneous rms electric and magnetic fields (unperturbed fields). These limits are less restrictive than the limits specified in Table II and as a result are not referenced in this measurement report.

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3.2 EVALUATION RESULTS

Exposure Restrictions						
Mode	Max. Output Power (dBm)	Gain (dBi)	EIRP Power (dBm)	Frequency Band(MHz)	Power Density (W/m ²)	Limit of Power Density (W/m ²)
BLE-1M	5.94	1.00	6.94	2402-2480	0.010	10
2.4GWIFI-802.11b	15.01	1.00	16.01	2412-2472	0.080	10
2.4GWIFI-802.11g	11.02	1.00	12.02		0.030	10
2.4GWIFI-802.11n HT20	10.84	1.00	11.84		0.030	10
2.4GWIFI-802.11n HT40	10.14	1.00	11.14	2422-2462	0.030	10
Radar	6.75	5.0	11.75	60000-63780	0.03	10

Note:

- 1). The maximum output power of radar were refer to the report CR230422500-14 which issued on 04-27-2023 by China Certification ICT Co.,Ltd(Dongguan).
- 2). The maximum output power of BLE were refer to the report E20221124437601-2 which issued on 01-11-2023 by GUANGZHOU GRG METROLOGY & TEST CO., LTD.
- 3). The maximum output power of 2.4G WIFI were refer to the report E20221124437601-1 which issued on 01-10-2023 by GUANGZHOU GRG METROLOGY & TEST CO., LTD.
- 4). The field calculation does not take into account the antenna size, which is assumed to be a point source. An ideal isotropic antenna is used as a reference to compare the performance of practical antennas: P watts is radiated, from a point, uniformly over the surface of sphere of radius R . Assumed use distance from EUT to Human, **20 cm** separation distance warning is required.

The Formula

$$S = \frac{P}{4\pi R^2}$$

Whereas,

S = power density

R=distance from observation point to the antenna (m)

P= The maximum e.i.r.p of the transmitter (W) .

In this section, the power density at 20 cm location is calculated to examine if it is lower than the limit.

For simultaneously transmit system According to EN62311:2008 sections 8.5 Frequency range from 3 kHz – 300GHz (IEEE-based):

When multiple sources are introduced into an environment, it becomes necessary to address the sources interdependently, since each source will contribute some percentage of the ME toward the total exposure at a fixed location. The sum of the ratios of the exposure from each source (expressed as a plane-wave equivalent power density) to the corresponding ME for the frequency of each source is evaluated. The exposure complies with the ME if the sum of the ratios is less than unity, i.e.,

$$\sum_{i=1}^n \frac{S_{E_i}(\text{duty factor})}{MPE_{E_i}} < 1$$

and

$$\sum_{i=1}^n \frac{S_{H_i}(\text{duty factor})}{MPE_{H_i}} < 1$$

For the calculated power density should comply with:

$$\sum_{i=1}^n \frac{S_i}{MPE_i} < 1$$

The BLE and WiFi do not support simultaneous transmission, the BLE and radar do not support simultaneous transmission, the wifi and radar support simultaneous.

The worst case:

Max. WWAN + Max. Radar:

Power Density of 2.4GWIFI-802.11b/ Limit of Power Density of 2.4GWIFI-802.11b + Power Density of Radar/ Limit of Power Density of Radar = 0.08(W/m²) / 10(W/m²) + 0.03(W/m²) / 10(W/m²) = 0.01 <

The sum of the MPE ratios is less than 1, the test result is passed.

----- End of Report -----